

Application of Sustainable City Logistics in Saudi Arabia

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Abstract

The kingdom of Saudi Arabia has advantages in trade and logistics services that other countries do not have. By 2020 there was a significant increase in logistics market revenue with reach almost SAR 94 billion (USD \$ 25 billion), which, in this case, opens up opportunities for FDI (Foreign Direct Investment) that must be exploited. Components and logistics services are a series of activities planning, organizing, and controlling all activities in the flow of materials, from raw materials to final consumption and the return flow of manufactured products, with the aim of satisfying the needs and desires of customers and other interested parties. city. Therefore, the sustainability of city logistics requires synergy between policy makers (government) and also the community (public) with the private sector (private) with steps such as simplification of regulations, provision of urban infrastructure, low carbon emissions in transportation means of delivery of logistics services, network governance. modern traffic so that this public-private partnership is the key to the effectiveness and efficiency of a sustainable urban logistics chain.

Keywords: Logistic, Sustainable Logistic, Logistic Management.

1. Introduction

The Kingdom of Saudi Arabia has a unique advantage in trade and logistics that is rarely possessed by a country, which makes the Kingdom of Saudi Arabia competitive and superior in trade competition with other GCC (Gulf Cooperation Council) countries. In addition, the Government is also the only G20 participant country with the largest economy to be a pioneer in the region of Arab countries.

The advantage possessed by the Kingdom of Saudi Arabia is a strategic location owned by it which is a trade door that becomes a trade route between the three continents that connects countries in Asia and Europe. The Kingdom of Saudi Arabia is the only country in the Arabian Gulf that lies between two seas: the Arabian Gulf, through which a third of global oil exports pass, and the Red Sea, through which 12% of international trade passes, giving it a lucrative regional advantage for the Kingdom of Saudi Arabia which also have large regional market with excellent prospects for growth Saudi Arabia's logistics market is valued at SAR 67.5 billion (USD \$ 18 billion), making it the largest among the GCC nations. It accounts for 55% of the total GCC logistics market and is ranked 3rd most attractive within emerging markets. It is also one of the fastest growing logistics sectors globally and is expected to

reach almost SAR 94 billion (USD \$ 25 billion) by 2020 (<https://www.investsaudi.sa/>, 2020). It is this strategic location that has increased the inflow of Foreign Direct Investment FDI which has brought the economy of the Kingdom of Saudi Arabia in the last five years to a qualitative leap and placed it at the forefront of economic reform

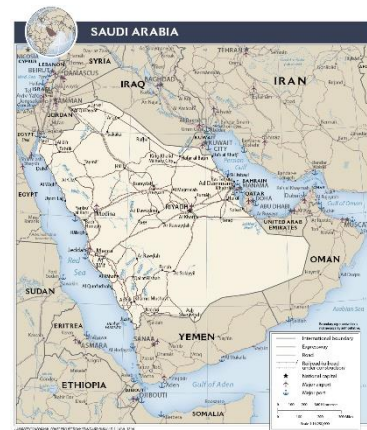


Fig 1. City logistics and Transportation Map in Saudi Arabia

The Saudi Vision in 2030 seeks to achieve a comprehensive transformation of the Saudi economy by increasing investment to stimulate the economy and transforming the Kingdom of Saudi Arabia into a global hub that connects Asia, Europe and Africa. Its geographical advantages based on access to major emerging markets and important sea routes, along with massive infrastructure developments and simplification of permits have played a major role in this economic transformation of the Kingdom of Saudi Arabia. The Saudi government is committed to developing significant investments allocated in the planned expansion of infrastructure projects for the transport sector. The Vision in 2030 has a goal where the Ministry of Transportation projects a self-financing of 20%, which can facilitate private sector participation in ports, airports, railways, road infrastructure and strategic services. (Ministry of Transport and Logistic Services, 2020)

2. Logistic Components and Logistic Services

According to Jonsson and Mattsson (2005), logistics is defined as the planning, organizing, and controlling of all activities in the flow of materials, from raw materials to final consumers and the return flow of manufactured products, with the aim of satisfying the needs and desires of customers and other interested parties, namely to provide good customer service, low costs, low tied up capital and minimal environmental consequences. In other words, a logistics concept is needed in an industry, because it cannot be denied that there will definitely be a distance between places to process an object from starting a raw material, to being processed which will eventually be processed into finished goods and must also be sent for delivery. marketed. To carry out this activity, good planning and management is needed to deal with various factors in it so that logistics activities within a company, both goods and services, can run effectively and efficiently.

Where it can be said that logistics is a science in which there is a series of activities that include the effectiveness of planning, implementation, and supervision of a process of moving material products (goods or services, energy, or other resources) from the point of origin to the point of consumption by way of the most efficient.

According to H. Ch. Pohl (1998) concludes that logistics are the following 3 things:

1. Logistics is the process of the physical flow of goods/services and the accompanying information. Basically, logistics is the process of sending goods or services from one place, namely the place of origin of the provider or raw material to the place where the object or service is needed to be processed or then marketed elsewhere.
2. Logistics is a concept of integrated management of goods/services and information flow. In other words, between the place of delivery and also the place of the recipient, they must know information about the movement of the object or service. With good coordination, the movement of goods or services can be monitored carefully and concrete and precise data can also be

obtained so that the logistics process can run quickly.

3. Logistics is an interdisciplinary field (apart from its own heritage, it also utilizes technical, military, mathematical and economic sciences, including management) where the object of research is the regularities and phenomena that occur during the flow of goods/information through the supply chain (supply chain management). because a logistics delivery of goods or services has many factors in it, in terms of technical workmanship as well as the equipment and technology used, not forgetting also how the administrative process and information system travel from the delivery.

The application of the objective of effective and efficient logistics activities can be made possible due to several things. In Szymonic. A (2012), some of the things that cause logistics activities to be effective and efficient are movement and transportation, warehousing and storage, industrial packaging, material manipulation, stock control, order setting, demand forecasting, production planning, purchasing, customer service at a professional level. appropriate, warehouse and factory locations, spare parts supply and after-sales, waste collection and disposal.

3. City Logistics

Urban logistics is a flow of goods transportation in urban areas with the aim of creating a movement of the flow of goods from raw materials to a place to process the material and then supplying goods to the urban center area by using means of transportation to support economic and social development in the city. The explicit purpose of urban logistics is to optimize an already sophisticated urban transportation system to advance the city (Crainic, 2008). Cities, due to their dense population within urban areas, concentrate on increasing their logistical activities in order to fulfil urban citizens' demands for goods supply and related services. A range of terms can be found in the literature describing the related activities and defining their scope, among which urban goods movement, urban freight transport, urban goods transport, urban freight traffic, urban goods distribution, urban logistics and city logistics are the same thing (Ma, Y. 2014). The term 'city logistics' is used to describe all logistical activities taking place within a city, including the goods movement to, from, within and through urban areas. Hereby it is not just limited to personal consumer goods – industrial goods and postal products required by urban business are also indispensable objects within the scope of city logistics. All related logistical activities and operations of collecting and delivering goods, such as warehousing, transportation, home delivery, reverse logistics (e.g., waste collection, goods return and repair) as well as any value-added-service activities (e.g., inventory management) are defined as the major content of city logistics. Also, other activities regarding traffic infrastructure such as urban road maintenance and building and telecommunication infrastructure have a close relationship with city logistics; they build up the basis and provide production factors. (Andersen, S. et al., 2005).

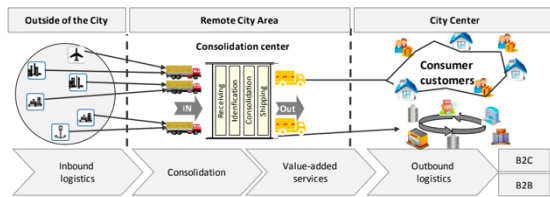


Fig 2. City logistics operational model

It can be seen in Figure 1. where the operational model is a core of city logistics, which is where goods are transported by each conveyance with a larger loading capacity (such as trucks, ships, trains or airplanes) from producers or traders in outside the city which must later be unloaded at the logistics center and transferred to a city logistics vehicle with a smaller loading capacity (in most cases) on the outskirts of the city, and then shipped to private customers or business associates in urban areas after last-mile delivery. Then the empty capacity on the city logistics vehicle will be used to fulfill reverse logistics tasks (eg, collecting carton packages or sending back returned goods). Logistics activities, such as receiving goods, loading and unloading, identification, consolidation, picking and packing, storage, labeling, transportation, distribution are realized in the operational model as above (Fig 1.) (Ma, Y. 2014).

According to Anand, van Duin & Tavasszy (2014) argue that urban freight transportation is part of city logistics, but focuses more on vehicle movement and delivery of goods. If urban logistics activities can be managed properly it will be able to support the sustainability of the economy of an area, however, city logistics can also cause problems for the city itself such as congestion, noise, and environmental conditions that can worsen due to air pollution caused by city logistics activities. , because it is undeniable that a logistics company often uses very large vehicles, from its size itself, if the travel path is not managed and planned properly then traffic jams will inevitably arise and of course these large vehicles have very high emissions which will have a negative impact on the environment. environment either directly or indirectly. To create an effective and efficient flow of goods in urban areas, according to Rosita, M, (2010). There are three important factors to consider, namely:

1. Transportation Facilities

where adequate transportation facilities will make the delivery of goods smoother and safer for the senders and reduce the number of accidents as well as for the goods themselves so that there is no damage to the goods, therefore the choice of mode and also the condition of the mode of transportation that will be used by the logistics actors need to be considered.

2. Business

where with good business management the delivery of goods will also become more effective and efficient. It has been mentioned that the delivery of goods is not only related to field conditions but also the conditions of the

administration, a good logistics business person can coordinate how to make the delivery of goods or services more effective and efficient in terms of physical delivery and also the delivery of information.

3. As well as other issues related to the urban environment

such as licensing and other administrative matters. At the same time, these factors must also be in synergy with local government policies, such as economic, transportation, infrastructure, and environmental issues, because if a delivery is hampered by administrative problems, logistics activities will not run effectively and efficiently, the region has its own regulations. himself regarding administration, starting from the operation of his office to the delivery of goods or services, not only for an area, even for crossing a regional boundary, there are separate rules again. Therefore, the selection of paths for logistics delivery is very important, because with easier administration, logistics activities will be carried out more effectively and efficiently.

4. Sustainable City Logistic

Talking about the sustainability of city logistics cannot be separated from the sustainability of the city itself, because city logistics activities are one of the activities that occur in the city. Therefore, according to Taki, et al (2017) Policy integration between urban spatial planning and transportation to encourage the achievement of sustainable urban development where the principles of planning and design are adjusted to the objectives of the strategic level of urban environmental development. To achieve sustainable urban logistics, there are four groups, namely shippers, freight forwarders, administrators, and residents who are involved in city logistics. As these stakeholders have different goals and different perspectives on urban freight transport, coordination among stakeholders is needed to make progress towards a more sustainable city (Taniguchi, 2014).

According to Taniguchi (2014) there are three important elements to be able to develop city logistics:

1. Application of innovative technology ICT (Information and Communication Technology) and ITS (Intelligent Transportation System).

A technology to assist transportation in general, often contains maps and information related to modes of travel such as the paths that can be used that have been created and determined by artificial intelligence where they provide the most effective and efficient route choices regarding conditions in the field regarding obstacles such as accidents. that occur along the route of travel and also other obstacles such as construction or road narrowing that has the potential to create congestion or decrease the speed of vehicles on a road. no less a trip estimate that

measures the speed of the vehicle and also the distance traveled by a trip that also estimates the existing obstacles, with a measured and clear estimate, a more mature plan for a trip can be created and subsequent trips can be more planned and structured.

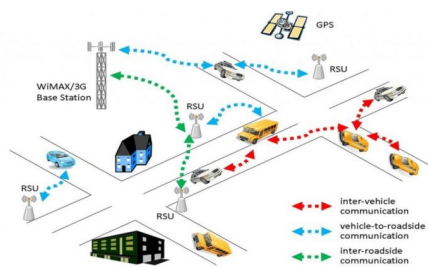


Fig 3. Example of an Intelligent Transport System (ITS) scenario

According to Vanni, R. et, al (2016) in Fig 3. it can be seen how ITS works in the field. ITS is needed to meet the needs in several sectors. First, governance which includes traffic regulation and guidance, road planning, road early warning, and bus supervision and management. Second, the enterprise sector includes vehicle schedules, real-time crash alerts, and commercial analysis data. Third, general service users include detailed geographic information services, accurate real-time road condition services, accurate traffic information services, and real-time vehicle information services.

This sensor is used to determine road conditions using CCTV. Generate density data by calculating the number of cars and motorcycles passing on the road, and the average speed of road users. It is undeniable that some roads do not have CCTV, so the sensors are replaced by using applications such as Google Maps or Waze which of course require cooperation. In addition to vehicles, this system also functions for pedestrians, especially during the Covid-19 pandemic so that it supports social distancing programs.

2. Changes in the mindset of logistics managers

Good management is also needed in logistics delivery, therefore finding someone who is good and competent in logistics is very important because he or she must be able to see and understand the existing data related to logistics. Moreover, with technology such as ITS, the resulting data will be more complicated, if a logistics manager cannot convert the data into information, let alone make the right decisions for the progress of a logistics.

3. Public-private partnership. Tambahin lagi definisi PPP

In relation to urban freight transport, the Public-Private Partnership concept refers to a form of partnership between public sector

entities (e.g., central or local governments, administrations, public institutions) and private (e.g., logistics companies, retailers, economic associations) to use their different comparative advantages. from all kinds of aspects including information, managerial knowledge and financial resources, etc. to realize the city's logistics goals. With respect to the formal level of partnership, three categories can be identified: Informal cooperation, contractual agreements, joint ventures (JVs). (Ma, Y. 2014)

Smooth administration can also be a factor in the effectiveness of logistics, if a collaboration can be established and administration can be simplified then logistics will run better. Not only related to administration, the burden that must be borne by a company can be reduced if cooperation or partnership is established, with that logistics activities can run better by reducing the burden that must be carried by a company. In general, PPP has become a common and popular means for developing, financing and operating infrastructural projects.

Russo and Comi (2012) identified four courses of action that can be used to understand how sustainable logistics fits into urban areas :

1. Related to material infrastructure.

This step can be in line if it refers to the relationship of the urban transportation network (for example the use of urban transportation, the choice of mode as well as utilities or the road network or transportation network is very influential here. With the existence of adequate urban transportation in terms of mode choice and also road infrastructure and so on then delivery of goods and logistics will become more effective and efficient)

2. Associated with immaterial infrastructure.

Which includes a traffic information system, route optimization services, other information services via internet access, and centralized route planning (Intelligent Transportation Systems/ITS). because in the era of modern technology as it is now, the existence of a technology, especially in the field of transportation, will make it easier for shippers to make their delivery trips, just like ITS, with ITS such as automatic maps that provide data about congestion and obstacles that exist in travel routes such as accidents or road repairs as well as other events that can hinder travel can be avoided intelligently and carefully. not only that, even if a map could basically show the driver the way then there would be no possibility of getting lost or going wrong in the delivery of goods, and the only remaining factor was human error in operation.

3. Regarding equipment and regulations.

Such as regulations on loading, handling and transporting new, low-emission vehicles; on the transportation unit, when referring to the characteristics of the transportation unit (e.g.

reduction of truck emissions and use of electric vehicles). It has little or nothing to do with the efficiency and effectiveness of delivery, but it is very useful for sustainable goals in our environment. It is undeniable that logistics, especially on a large scale, must use heavy and large objects or vehicles, and often these vehicles have very high emissions and can have a negative impact on the surrounding environment or even the environment as a whole in the long term. So using environmentally friendly equipment is expected to reduce the negative impact of an activity which here is in the realm of logistics.

4. Traffic network management.

In this series we can find traffic rules (e.g. access time, heavy vehicle network, road-pricing, maximum parking time, maximum occupied surface and special permits). not only for things that can be seen and used at the same time, but also for things that are of a subtle nature, such as administrative matters, in carrying out goods delivery trips, almost all of them must pass through certain regional or regional boundaries, if in terms of administration, passing through an area is very difficult. complicated and difficult to meet the criteria it will hinder a delivery of goods where an effectiveness and efficiency will not be created here. Not only complicated administration, passing prices such as the price of entering toll roads and other infrastructure access will also be a benchmark in this case, is the toll price deemed appropriate and can indeed provide a faster time for the delivery process? it is questionable, as with other paid things. if using inter-island delivery services by boat, is it better than the price to be paid? if a delivery of goods does not heed this consideration, there will be unnecessary expenses that can actually be reduced to increase income for the company or parties involved in a logistics delivery.

6. Discussion

To be able to have sustainable urban logistics in Saudi Arabia, some aspects that can support sustainability are needed. The key to sustainable urban logistics is an effective and efficient system which creates the movement of the flow of goods from raw materials to a place to process these materials, then supplies goods to urban centers using transportation means with the aim of supporting existing economic and social development. in the city.

The operation of the system requires cooperation between the public (urban policy makers and urban communities) and also the private sector (companies that play in the logistics system) therefore the role of these two sectors is important in creating sustainable urban logistics. The private sector in Saudi logistics can hold FGDs with the Saudi government for things that are necessary and can be jointly collaborated between the government and the private sector to advance and expedite logistics travel in Saudi Arabia. With the FGD, the government and the private sector can better

recognize each other and also weigh and measure what capabilities, strengths, and weaknesses in the logistics sector they can improve.

In terms of the public sector, creating facilities that can accelerate access to logistics transportation routes and also the use of urban transportation, the choice of modes and also utilities or road networks or transportation networks are very influential here. With adequate urban transportation in terms of mode choice as well as road infrastructure and so on, the delivery of goods and logistics will become more effective and efficient.

Then how can policy makers manage the traffic network within the city such as road pricing, dwelling time/unloading time (if needed), access time in and out of the city for heavy vehicles, maximum load weight, permitted emission or pollution limits. Making traffic network management regulations inseparable from a series of sustainable urban logistics systems so that the city is expected to be able to regulate and control the crowds (crowd management) of traffic in the city.

Apart from physical facilities and regulations, information and technology cannot be separated from this series. Where the use of information is expected to help a series of logistics systems to be more effective and efficient as well as in: maps to the destination location and information related to mode travel such as rest areas, the nearest warehouse, or paths that can be used and determined by artificial intelligence which can provide the choice of the most effective and efficient path related to conditions in the field regarding obstacles such as accidents that occur along the route and also other obstacles such as construction or road narrowing that has the potential to create congestion or decrease the speed of vehicles on a road, so that the estimated time can be predicted accurately .

From the private sector, good management is also needed in terms of managing smooth logistics. How a company can plan the fastest travel route using information technology systems (ITS), it takes the right people to read the amount of data contained in the information technology system. Then in terms of the choice of mode used, it must also comply with the criteria for regulation of city pollution limits in order to reduce the negative impact of the contribution of pollution into the city and support the use of energy-friendly vehicles. No less important than the private sector, of course, is to determine the location of the warehouse/storage area so that the mobility of the logistics chain can run well, by determining the location of the warehouse/storage place with consideration of whether it will be placed in the city or outside the city is also an important part to suppress production costs so that the selling value to consumers or other interested parties is still very affordable so that the economic cycle in the city can still be productive.

This public-private partnership is the key to the effectiveness and efficiency of a sustainable urban logistics chain. With each sector being able to carry out their respective function well and also smooth administration can also be a factor in what we aim for sustainable urban logistics. It is undeniable that some

sectors have their respective advantages and disadvantages, therefore if Saudi Arabia can establish good cooperation between all sectors, some of the shortcomings will be covered by other sectors in the smooth logistics.

7. Conclusion

In essence, to improve the quality of Saudi Arabia urban logistics in order to lead to sustainable urban logistics, several things must be considered. The first is physical facilities such as the selection of modes that are more environmentally friendly or the existence of an adequate transportation network, the second is immaterial facilities such as ITS technology and other system technologies that can facilitate the logistics process, after that there is also management of the logistics and the last is additional matters such as the ease of good and easy administration and responsibility that must be considered by several related parties.

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